DATA SHEET

TDA1519
2 x 6 W stereo car radio power amplifier

Product specification
File under Integrated Circuits, IC01

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Philips Semiconductors

PHILIPS

GENERAL DESCRIPTION

The TDA1519 is an integrated class-B dual output amplifier in a 9-lead single in-line (SIL) plastic medium power package. The device is primarily developed for car radio applications.

Features

- Requires very few external components
- High output power
- Fixed gain
- Good ripple rejection
- Mute/stand-by switch
- Load dump protection
- AC and DC short-circuit-safe to ground and V_P
- Thermally protected
- Reverse polarity safe
- Capability to handle high energy on outputs ($V_P = 0$ V)
- No switch-on/switch-off plop
- Protected against electrostatic discharge
- Compatible with TDA1517 (except gain).

QUICK REFERENCE DATA

PARAMETER	CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage range						
operating		V_P	6,0	14,4	18,0	V
non-operating		V_P	–	–	30	V
load dump protected		V_P	–	–	45	V
Repetitive peak output current		I_{ORM}	–	–	2,5	A
Total quiescent current		I_{tot}	–	40	80	mA
Stand-by current		I_{sb}	–	0,1	100	µA
Switch-on current		I_{sw}	–	–	40	µA
Input impedance		$\|Z_I\|$	50	–	–	kΩ
Output power	THD = 0,5%; 4 Ω	P_o	–	5	–	W
	THD = 10%; 4 Ω	P_o	–	6	–	W
Channel separation		α	40	–	–	dB
Noise output voltage		$V_{no(rms)}$	–	150	–	µV
Supply voltage ripple rejection	f = 100 Hz	SVRR	40	–	–	dB
	f = 1 kHz to 10 kHz	SVRR	48	–	–	dB
Crystal temperature		T_c	–	–	150	°C

PACKAGE OUTLINE

9-lead SIL-bent-to-DIL; plastic (SOT110B); SOT110-1; 1996 July 19.

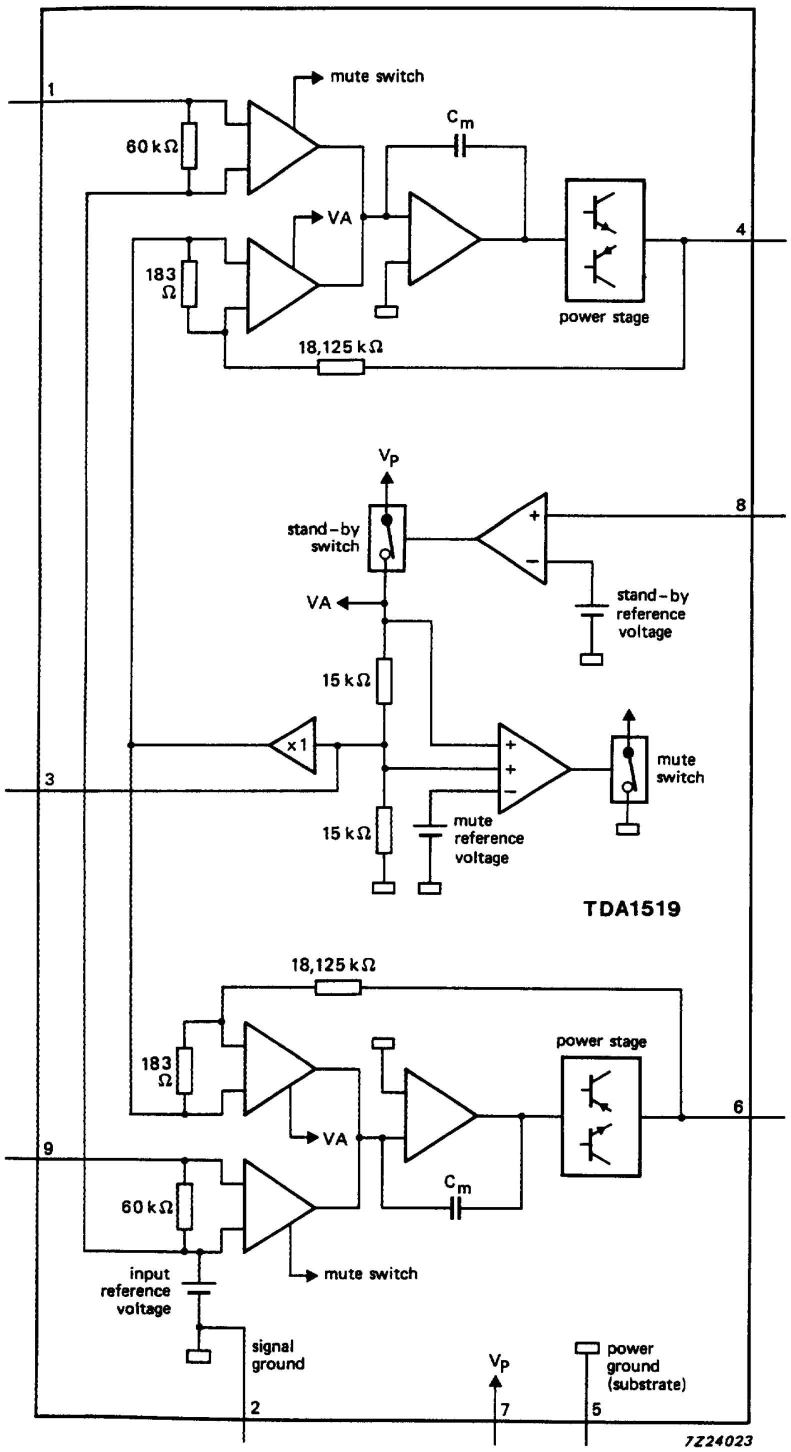


Fig.1 Block diagram.

PINNING

1	INV1	non-inverting input 1
2	GND1	ground (signal)
3	SVRR	supply voltage ripple rejection
4	OUT1	output 1
5	GND2	ground (substrate)
6	OUT2	output 2
7	V_P	supply voltage
8	M/SS	mute/stand-by switch
9	–INV2	non-inverting input 2

FUNCTIONAL DESCRIPTION

The TDA1519 contains two identical amplifiers with differential input stages. The gain of each amplifier is fixed at 40 dB. A special feature of this device is the mute/stand-by switch which has the following features:

- low stand-by current (< 100 μA)
- low mute/stand-by switching current (low cost supply switch)
- mute condition.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

PARAMETER	CONDITIONS	SYMBOL	MIN.	MAX.	UNIT
Supply voltage					
operating		V_P	–	18	V
non-operating		V_P	–	30	V
load dump protected	during 50 ms;				
	$t_r \geq 2,5$ ms	V_P	–	45	V
AC and DC short-circuit-safe voltage		V_{PSC}	–	18	V
Reverse polarity		V_{PR}	–	6	V
Energy handling capability at outputs	$V_P = 0$ V		–	200	mJ
Non-repetitive peak output current		I_{OSM}	–	4	A
Repetitive peak output current		I_{ORM}	–	2,5	A
Total power dissipation	see Fig.2	P_{tot}	–	15	W
Crystal temperature		T_c	–	150	°C
Storage temperature range		T_{stg}	–55	+ 150	°C

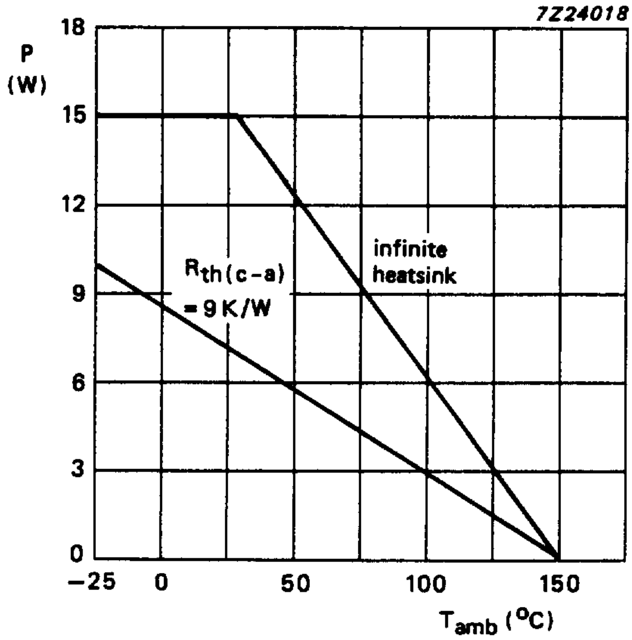


Fig.2 Power derating curve.

DC CHARACTERISTICS (note 1)

V_P = 14,4 V; T_{amb} = 25 °C; unless otherwise specified

PARAMETER	CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply						
Supply voltage range	note 2	V_P	6,0	14,4	18,0	V
Quiescent current		I_P	–	40	80	mA
DC output voltage	note 3	V_O	–	6,95	–	V
Mute/stand-by switch						
Switch-on voltage level	see Fig.3	V_{ON}	8,5	–	–	V
Mute condition		V_{mute}	3,3	–	6,4	V
Output signal in mute position	V_I = 1 V (max.); f = 20 Hz to 15 kHz	V_O	–	–	20	mV
Stand-by condition		V_{sb}	0	–	2	V
DC current in stand-by condition		I_{sb}	–	–	100	μA
Switch-on current		I_{sw}	–	12	40	μA

AC CHARACTERISTICS (note 1)

V_P = 14,4 V; R_L = 4 Ω; f = 1 kHz; T_{amb} = 25 °C; unless otherwise specified

PARAMETER	CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Output power	note 4;					
	THD = 0,5%	P_o	4	5	–	W
	THD = 10%	P_o	5,5	6,0	–	W
Total harmonic distortion	P_o = 1 W	THD	–	0,1	–	%
Low frequency roll-off	note 5;					
	–3 dB	f_L	–	45	–	Hz
High frequency roll-off	–1 dB	f_H	20	–	–	kHz
Closed loop voltage gain		G_v	39	40	41	dB
Supply voltage ripple rejection	note 6					
ON	f = 100 Hz	SVRR	40	–	–	dB
ON	f = 10 Hz to 10 kHz	SVRR	48	–	–	dB
mute		SVRR	48	–	–	dB
stand-by		SVRR	80	–	–	dB
Input impedance		$\|Z_i\|$	50	60	75	kΩ
Noise output voltage	note 7;					
ON	R_S = 0 Ω	$V_{no(rms)}$	–	150	–	μV
ON	R_S = 10 kΩ	$V_{no(rms)}$	–	250	500	μV
mute	note 8	$V_{no(rms)}$	–	120	–	μV
Channel separation	R_S = 10 kΩ	α	40	–	–	dB
Channel balance		$\|\Delta G_v\|$	–	0,1	1	dB

Notes to the characteristics

1. All characteristics are measured using the circuit shown in Fig.4.
2. The circuit is DC adjusted at V_P = 6 V to 18 V and AC operating at V_P = 8,5 V to 18 V.
3. At 18 V < V_P < 30 V the DC output voltage ≤ V_P/2.
4. Output power is measured directly at the output pins of the IC.
5. Frequency response externally fixed.
6. Ripple rejection measured at the output with a source impedance of 0 Ω (maximum ripple amplitude of 2 V) and a frequency between 100 Hz and 10 kHz.
7. Noise voltage measured in a bandwidth of 20 Hz to 20 kHz.
8. Noise output voltage independent of R_S (V_I = 0 V).

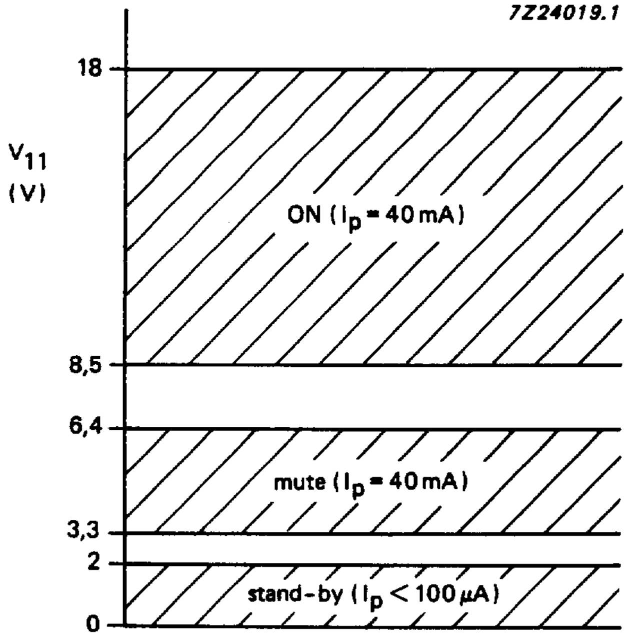


Fig.3 Stand-by, mute and ON conditions.

APPLICATION INFORMATION

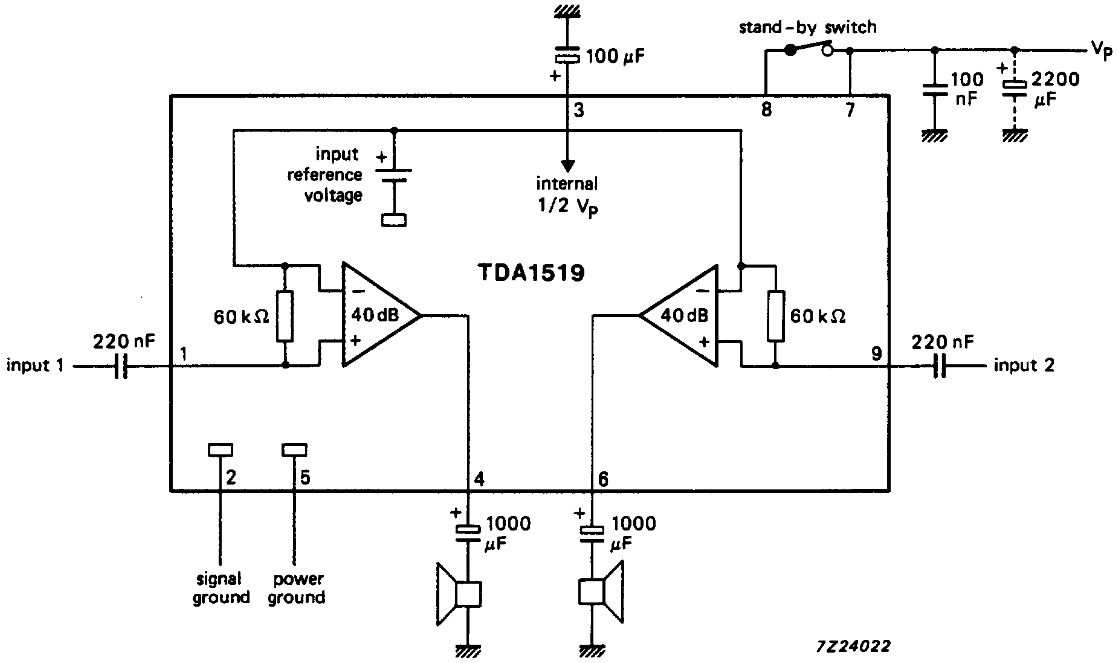
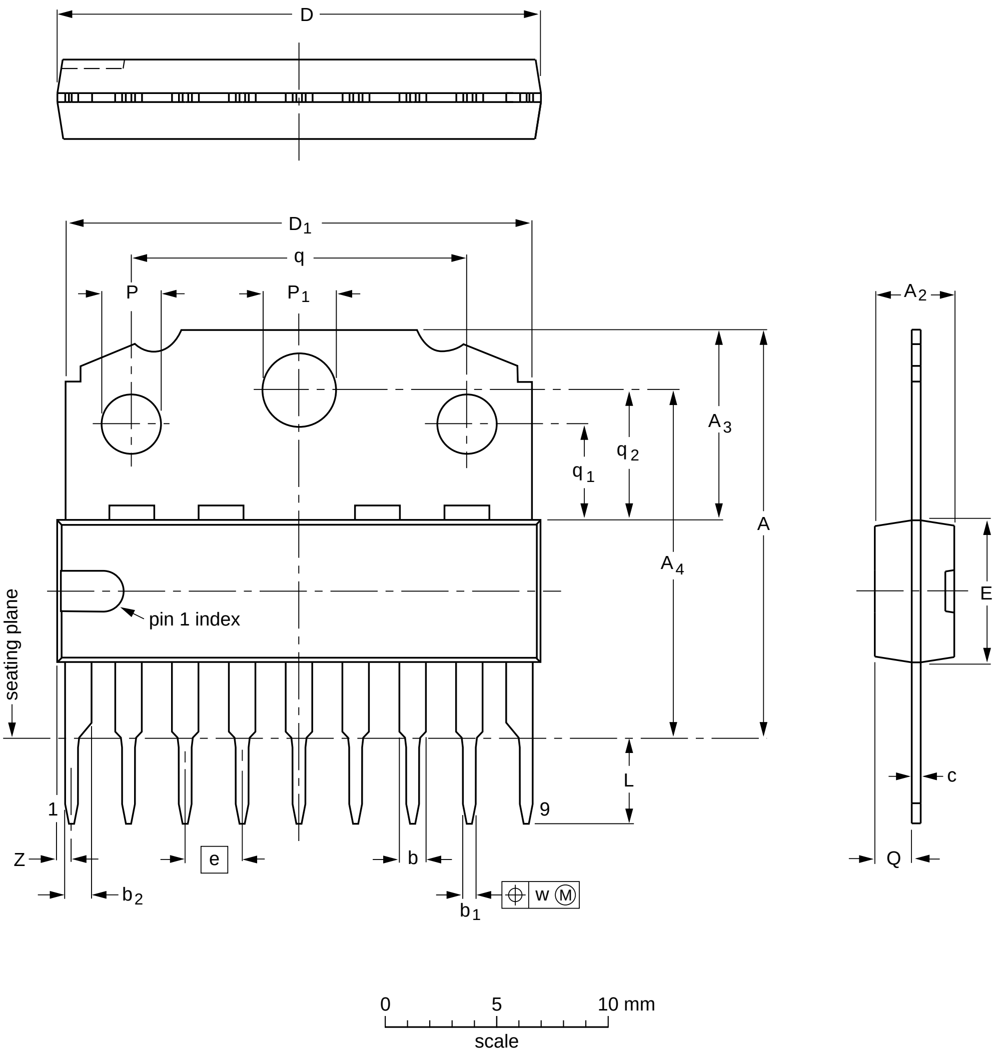


Fig.4 Application circuit diagram.

PACKAGE OUTLINE

SIL9MPF: plastic single in-line medium power package with fin; 9 leads **SOT110-1**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_2 max.	A_3	A_4	b	b_1	b_2	c	D(1)	D_1	E(1)	e	L	P	P_1	Q	q	q_1	q_2	w	Z(1) max.
mm	18.5 17.8	3.7	8.7 8.0	15.8 15.4	1.40 1.14	0.67 0.50	1.40 1.14	0.48 0.38	21.8 21.4	21.4 20.7	6.48 6.20	2.54	3.9 3.4	2.75 2.50	3.4 3.2	1.75 1.55	15.1 14.9	4.4 4.2	5.9 5.7	0.25	1.0

Note

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT110-1						~~92-11-17~~ 95-02-25

SOLDERING

Introduction

There is no soldering method that is ideal for all IC packages. Wave soldering is often preferred when through-hole and surface mounted components are mixed on one printed-circuit board. However, wave soldering is not always suitable for surface mounted ICs, or for printed-circuits with high population densities. In these situations reflow soldering is often used.

This text gives a very brief insight to a complex technology. A more in-depth account of soldering ICs can be found in our *“IC Package Databook”* (order code 9398 652 90011).

Soldering by dipping or by wave

The maximum permissible temperature of the solder is 260 °C; solder at this temperature must not be in contact with the joint for more than 5 seconds. The total contact time of successive solder waves must not exceed 5 seconds.

The device may be mounted up to the seating plane, but the temperature of the plastic body must not exceed the specified maximum storage temperature ($T_{stg\ max}$). If the printed-circuit board has been pre-heated, forced cooling may be necessary immediately after soldering to keep the temperature within the permissible limit.

Repairing soldered joints

Apply a low voltage soldering iron (less than 24 V) to the lead(s) of the package, below the seating plane or not more than 2 mm above it. If the temperature of the soldering iron bit is less than 300 °C it may remain in contact for up to 10 seconds. If the bit temperature is between 300 and 400 °C, contact may be up to 5 seconds.

DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.